CLAIMS

1. A picture processing apparatus for generating a second picture from a first picture, said second picture being of higher picture quality than said first picture, comprising:

acquisition means for acquiring said first picture;

storage means for storing said first picture, acquired by said acquisition means;

storage processing means for storing a new first picture acquired by said acquisition means at a position registering with said first picture stored in said storage means to permit a storage picture of said first picture to be stored in said storage means;

first extraction means for extracting the first pixel information from both said storage picture and said first picture, acquired by said acquisition means, based on the position of a subject pixel of said second picture;

feature value detection means for detecting a preset feature value from said first pixel information;

classification means for classifying said subject pixel to one of a plurality of classes based on said feature value;

second extraction means for extracting the second pixel information from both said storage picture and said first picture, acquired by said acquisition means, based on the position of said subject pixel; and

generating means for generating said subject pixel by using said second pixel information in accordance with a generating system preset corresponding to the classes

classified by said classification means.

2. The picture processing apparatus according to claim 1 wherein said storage processing means weight-sums said first picture and said storage picture in accordance with a preset weighting value to cause a resulting picture to be stored in said storage means.

3. The picture processing apparatus according to claim 2 wherein said storage processing means detects the motion of said first picture and sets said weighting value based on the detected motion.

4. The picture processing apparatus according to claim 2 wherein said storage picture is a picture higher in SN ratio in a still picture portion than said first picture.

5. The picture processing apparatus according to claim 1 wherein said storage processing means detects the motion of a feature area included in said first picture and causes said first picture to be moved to and stored at a position corresponding to said detected motion to cause the resulting storage picture to be stored in said storage means.

6. The picture processing apparatus according to claim 5 wherein the pixel density of said storage picture is higher than that of said first picture.

7. The picture processing apparatus according to claim 5 wherein the pixel density of said storage picture is equal to that of said first picture.

8. The picture processing apparatus according to claim 5 wherein the number of said pixels of said storage picture is larger than that of said first picture.

9. The picture processing apparatus according to claim 1 wherein said first extraction means extracts class taps from said first picture as said first pixel information and wherein said feature value detection means detects the distribution of pixel values of pixels forming said class tap as said feature value.

10. The picture processing apparatus according to claim 1 wherein said first extraction means extracts one or a plurality of pixels from each of said first picture and said storage picture from each of said first picture and said storage picture; said feature value detection means making still/moving decision of said subject pixel by using the pixel values of said one or a plurality of pixels; said feature value detection means detecting the results of decision as said feature value.

11. The picture processing apparatus according to claim 10 wherein said feature value detection means calculates the difference in luminance values of said first picture and said storage picture by using the pixel values of said one or a plurality of pixels; said feature value detection means detecting the calculated results as said feature value.

12. The picture processing apparatus according to claim 1 wherein said first extraction means extracts a first class tap from said first picture as said first pixel information and also extracts a second class tap from said storage picture; said feature value detection means making still/moving decision of said subject pixel by using said first and second class taps; said feature value detection means detecting the results of decision and the distribution of pixel values of pixels making up said first class tap as said feature values.

13. The picture processing apparatus according to claim 1 wherein said second extraction means extracts prediction taps as said second pixel information; said generating means including coefficient storage means having stored therein coefficients preset from class to class; said generating means executing calculations using said coefficients and said prediction taps to generate said second picture.

14. A picture processing method for generating a second picture from a first picture, said second picture being of higher picture quality than said first picture, comprising:

an acquisition step of acquiring said first picture;

a storage step of storing said first picture, acquired by said acquisition step;

a storage processing step of storing a new first picture acquired by said acquisition step at a position registering with said first picture stored at said storage step to permit a storage picture of said first picture to be stored at said storage step;

a first extraction step of extracting the first pixel information from both said storage picture and said first picture, acquired by said acquisition step, based on the position of a subject pixel of said second picture;

a feature value detection step of detecting a preset feature value from said first pixel information;

a classification step of classifying said subject pixel to one of a plurality of classes based on said feature value;

a second extraction step of extracting the second pixel information from both said storage picture and said first picture, acquired by said acquisition step, based on

the position of said subject pixel; and

a generating step of generating said subject pixel by said second pixel information in accordance with a generating system preset corresponding to the classes classified by said classification step.

15. The picture processing method according to claim 14 wherein said storage processing step weight-sums said first picture and said storage picture in accordance with a preset weighting value to cause a resulting picture to be stored at said storage step.

16. The picture processing method according to claim 15 wherein said storage processing step detects the motion of said first picture and sets said weighting value based on the detected motion.

17. The picture processing method according to claim 15 wherein said storage picture is a picture higher in SN ratio in a still picture portion than said first picture.

18. The picture processing method according to claim 14 wherein said storage processing step detects the motion of a feature area included in said first picture and causes said first picture to be moved to and stored at a position corresponding to said detected motion to cause the resulting storage picture to be stored at said storage step.

19. The picture processing method according to claim 18 wherein the pixel density of said storage picture is higher than that of said first picture.

20. The picture processing method according to claim 18 wherein the pixel density of said storage picture is equal to that of said first picture.

21. The picture processing method according to claim 18 wherein the number of said pixels of said storage picture is larger than that of said first picture.

22. The picture processing method according to claim 14 wherein said first extraction step extracts class taps from said first picture as said first pixel information and wherein said feature value detection step detects the distribution of pixel values of pixels forming said class tap as said feature value.

23. The picture processing method according to claim 14 wherein said first extraction step extracts one or a plurality of pixels from each of said first picture and said storage picture as said first pixel information; said feature value detection step making still/moving decision of said subject pixel by using the pixel values of said one or a plurality of pixels; said feature value detection step detecting the results of decision as said feature value.

24. The picture processing method according to claim 23 wherein said feature value detection step calculates the difference in luminance values of said first picture and said storage picture, by using the pixel values of said one or a plurality of pixels; said feature value detection step detecting the calculated results as said feature value.

25. The picture processing method according to claim 14 wherein said first extraction step extracts a first class tap from said first picture as said first pixel information and also extracts a second class tap from said storage picture; said feature value detection step making still/moving decision of said subject pixel by using said first and second class taps; said feature value detection step detecting the results of decision and the

distribution of pixel values of pixels making up said first class tap as said feature values.

26. The picture processing method according to claim 14 wherein said second extraction step extracts prediction taps as said second pixel information; said generating step executing calculations using said coefficients preset from class to class and said prediction taps to generate said second picture.

27. A recording medium having recorded thereon a computer-readable program adapted for generating a second picture from a first picture, said second picture being of higher picture quality than said first picture, said program comprising:

an acquisition step of acquiring said first picture;

a storage step of storing said first picture, acquired by said acquisition step;

a storage processing step of storing a new first picture acquired by said acquisition step at a position registering with said first picture stored at said storage step to permit a storage picture of said first picture to be stored at said storage step;

a first extraction step of extracting the first pixel information from both said storage picture and said first picture, acquired by said acquisition step, based on the position of a subject pixel of said second picture;

a feature value detection step of detecting a preset feature value from said first pixel information;

a classification step of classifying said subject pixel to one of a plurality of classes based on said feature value;

a second extraction step of extracting the second pixel information from both said storage picture and said first picture, acquired by said acquisition step, based on the position of said subject pixel; and

a generating step of generating said subject pixel by said second pixel information in accordance with a generating system preset corresponding to the classes classified at the classification step.

28. The recording medium having a computer-readable program recorded thereon according to claim 27 wherein said storage processing step weight-sums said first picture and said storage picture in accordance with a preset weighting value to cause a resulting picture to be stored at said storage step.

29. The recording medium having a computer-readable program recorded thereon according to claim 28 wherein said storage processing step detects the motion of said first picture and sets said weighting value based on the detected motion.

30. The recording medium having a computer-readable program recorded thereon according to claim 28 wherein said storage picture is a picture higher in SN ratio in a still picture portion than said first picture.

31. The recording medium having a computer-readable program recorded thereon according to claim 27 wherein said storage processing step detects the motion of a feature area included in said first picture and causes said first picture to be moved to and stored at a position corresponding to said detected motion to cause the resulting storage picture to be stored at said storage step.

32. The recording medium having a computer-readable program recorded thereon according to claim 28 wherein the pixel density of said storage picture is higher than that of said first picture.

33. The recording medium having a computer-readable program recorded thereon according to claim 28 wherein the pixel density of said storage picture is equal to that of said first picture.

34. The recording medium having a computer-readable program recorded thereon according to claim 28 wherein the number of pixels of said storage picture is larger than that of said first picture.

35. The recording medium having a computer-readable program recorded thereon according to claim 27 wherein said first extraction step extracts class taps from said first picture as said first pixel information and wherein said feature value detection step detects the distribution of pixel values of pixels forming said class tap as said feature value.

36. The recording medium having a computer-readable program recorded thereon according to claim 27 wherein said first extraction step extracts one or a plurality of pixels from each of said first picture and said storage picture as said first pixel information; said feature value detection step making still/moving decision of said subject pixel by using the pixel values of said one or a plurality of pixels; said feature value detection step detecting the results of decision as said feature value.

37. The recording medium having a computer-readable program recorded thereon

according to claim 36 wherein said feature value detection step calculates the difference in luminance values of said first picture and said storage picture by using the pixel values of said one or a plurality of pixels; said feature value detection step detecting the calculated results as said feature value.

38. The recording medium having a computer-readable program recorded thereon according to claim 27 wherein said first extraction step extracts a first class tap from said first picture as said first pixel information and also extracts a second class tap from said storage picture; said feature value detection step making still/moving decision of said subject pixel by using said first and second class taps; said feature value detection step detecting the results of decision and the distribution of pixel values of pixels making up said first class tap as said feature values.

39. The recording medium having a computer-readable program recorded thereon according to claim 27 wherein said second extraction step extracts prediction taps as said second pixel information; said generating step executing calculations using said coefficients preset from class to class and said prediction taps to generate said second picture.

40. A picture processing apparatus for learning preset data used in generating a second picture from a first picture, said second picture being higher in picture quality than said first picture; comprising:

generating means for generating a pupil picture equivalent to said first picture;

storage means for storing said pupil picture;

storage processing means for causing a new pupil picture, generated by said generating means, to be stored at a position registering with said pupil picture stored in said storage means for causing a storage picture of said pupil picture to be stored in said storage means;

first extraction means for extracting said first picture information from both said storage picture and said pupil picture generated by said generating means, based on the position of said subject pixel of teacher data equivalent to said second picture;

feature value detection means for detecting a preset feature value from said first pixel information;

classification means for classifying said subject pixel to one of a plurality of classes;

second extraction means for extracting the second pixel information from both said storage picture and the first picture generated by said generating means, based on the position of said subject pixel; and

calculation means for finding said preset data from one class of classifying by said classification means to another, by using said second pixel information and said teacher data.

41. The picture processing apparatus according to claim 40 wherein said storage processing means weight-adds said pupil picture and said storage picture in accordance with a preset weighting value and causes the resulting picture to be stored in said storage means.

42. The picture processing apparatus according to claim 41 wherein said storage means sets said weighting value based on the values of said pupil picture and the storage picture or the difference values thereof.

43. The picture processing apparatus according to claim 41 wherein said storage processing means detects the motion of said pupil picture and sets said weighting value based on the detected motion.

44. The picture processing apparatus according to claim 41 wherein said storage picture is a picture higher in the SN ratio in a still picture portion thereof.

45. The picture processing apparatus according to claim 42 wherein said storage processing means detects the motion of a feature area contained in said pupil area and causes said pupil picture to be moved to and stored at a position corresponding to the detected motion to cause the resulting storage picture to be stored in said storage means.

46. The picture processing apparatus according to claim 45 wherein the pixel density of said storage picture is higher than that of said pupil picture.

47. The picture processing apparatus according to claim 45 wherein the pixel density of said storage picture is equal to that of said pupil picture.

48. The picture processing apparatus according to claim 40 wherein said first extraction means extracts a class tap from said pupil picture as said first pixel information and wherein said feature value detection means detects the distribution of pixel values of pixels making up said class tap as said feature value.

49. The picture processing apparatus according to claim 40 wherein said first extraction means extracts one or a plurality of pixels from each of said pupil picture and the storage picture as said first pixel information and wherein said feature value detection means uses the pixel values of said one or plural pixels to make still/moving decision of said subject pixel, while detecting the results of decision as said feature value.

50. The picture processing apparatus according to claim 49 wherein said first feature value detection means detects the differences of luminance values of said first picture and said storage picture by using the pixel value of said one or plural pixels and detects the calculated results as said feature value.

51. The picture processing apparatus according to claim 40 wherein said first extraction means extracts a first class tap from said pupil picture as said first pixel information, while extracting a second class tap from said storage picture; and wherein said feature value detection means makes still/moving decision of said subject pixel by using said first and second class taps and detects the results of decision and the distribution of pixel values of pixels making up said first class tap as said feature value.

52. The picture processing apparatus according to claim 40 wherein said second extraction means extracts prediction taps as said second pixel information.

53. A picture processing method by a picture processing apparatus for learning preset data used in generating a second picture from a first picture, said second picture being higher in picture quality than said first picture; comprising:

a generating step of generating a pupil picture equivalent to said first picture;

a storage step of storing said pupil picture;

a storage processing step of causing a new pupil picture, generated by processing at said generating step, to be stored at a position registering with said pupil picture stored in said storage step for causing a storage picture of said pupil picture to be stored in said storage step;

a first extraction step of extracting said first picture information from both said storage picture and said pupil picture generated by said generating step, based on the position of said subject pixel of teacher data equivalent to said second picture;

a feature value detection step of detecting a preset feature value from said first pixel information;

a classification step of classifying said subject pixel to one of a plurality of classes, by way of classification, based on said feature value;

a second extraction step of extracting the second pixel information from both said storage picture and the first picture generated by processing at said generating step, based on the position of said subject pixel; and

a calculation step of finding said preset data from one class of classifying by said classification step to another, by using said second pixel information and said teacher data.

54. The picture processing method according to claim 53 wherein said storage processing means weight-adds said pupil picture and said storage picture in

accordance with a preset weighting value and causes the resulting picture to be stored in said storage step .

55. The picture processing method according to claim 54 wherein said storage means sets said weighting value based on the values of said pupil picture and the storage picture or the difference values thereof.

56. The picture processing method according to claim 54 wherein said storage processing means detects the motion of said pupil picture and sets said weighting value based on the detected motion.

57. The picture processing method according to claim 54 wherein said storage picture is a picture higher in the SN ratio in a still picture portion thereof than said pupil picture.

58. The picture processing method according to claim 55 wherein said storage processing means detects the motion of a feature area contained in said pupil area and causes said pupil picture to be moved to and stored at a position corresponding to the detected motion to cause the resulting storage picture to be stored in said storage step.

59. The picture processing method according to claim 58 wherein the pixel density of said storage picture is higher than that of said pupil picture.

60. The picture processing method according to claim 58 wherein the pixel density of said storage picture is equal to that of said pupil picture.

61. The picture processing method according to claim 53 wherein said first extraction means extracts a class tap from said pupil picture as said first pixel information and

wherein said feature value detection means detects the distribution of pixel values of pixels making up said class tap as said feature value.

62. The picture processing method according to claim 53 wherein said first extraction means extracts one or a plurality of pixels from each of said pupil picture and the storage picture as said first pixel information and wherein said feature value detection means uses the pixel values of said one or plural pixels to make still/moving decision of said subject pixel, while detecting the results of decision as said feature value.

63. The picture processing method according to claim 62 wherein said first feature value detection means detects the differences of luminance values of said first picture and said storage picture by using the pixel value of said one or plural pixels and detects the calculated results as said feature value.

64. The picture processing method according to claim 53 wherein said first extraction means extracts a first class tap from said pupil picture as said first pixel information, while extracting a second class tap from said storage picture; and wherein said feature value detection means makes still/moving decision of said subject pixel by using said first and second class taps and detects the results of decision and the distribution of pixel values of pixels making up said first class tap as said feature value.

65. The picture processing method according to claim 53 wherein said second extraction means extracts prediction taps as said second pixel information.

66. A recording medium having recorded thereon a computer-readable program for a picture processing apparatus adapted for learning preset data usable for generating

a second picture from a first picture, said second picture being of higher picture quality than said first picture, said program comprising:

a generating step of generating a pupil picture equivalent to said first picture;

a storage step of storing said pupil picture;

a storage processing step of causing a new pupil picture, generated by processing at said generating step, to be stored at a position registering with said pupil picture stored in said storage step of causing a storage picture of said pupil picture to be stored in said storage step;

a first extraction step of extracting said first picture information from both said storage picture and said pupil picture generated by said generating step, based on the position of a subject pixel of teacher data equivalent to said second picture;

a feature value detection step of detecting a preset feature value from said first pixel information;

a classification step of classifying said subject pixel to one of a plurality of classes;

a second extraction step of extracting the second pixel information from both said storage picture and the first picture generated by processing at said generating step, based on the position of said subject pixel; and

a calculation step of finding said preset data from one class of classifying by said classification step to another, by using said second pixel information and said teacher data.

67. The recording medium having recorded thereon a computer-readable program according to claim 66 wherein said storage processing step weight-adds said pupil picture and said storage picture in accordance with a preset weighting value and causes the resulting picture to be stored at said storage step .

68. The recording medium having recorded thereon a computer-readable program according to claim 67 wherein said storage step sets said weighting value based on the values of said pupil picture and the storage picture or the difference values thereof.

69. The recording medium having recorded thereon a computer-readable program according to claim 67 wherein said storage processing step detects the motion of said pupil picture and sets said weighting value based on the detected motion.

70. The recording medium having recorded thereon a computer-readable program according to claim 67 wherein said storage picture is a picture higher in the SN ratio in a still picture portion thereof than said pupil picture.

71. The recording medium having recorded thereon a computer-readable program according to claim 68 wherein said storage processing step detects the motion of a feature area contained in said pupil area and causes said pupil picture to be moved to and stored at a position corresponding to the detected motion to cause the resulting storage picture to be stored at said storage step.

72. The recording medium having recorded thereon a computer-readable program according to claim 71 wherein the pixel density of said storage picture is higher than that of said pupil picture.

73. The recording medium having recorded thereon a computer-readable program according to claim 71 wherein the pixel density of said storage picture is equal to that of said pupil picture.

74. The recording medium having recorded thereon a computer-readable program according to claim 66 wherein said first extraction step extracts a class tap from said pupil picture as said first pixel information and wherein said feature value detection step detects the distribution of pixel values of pixels making up said class tap as said feature value.

75. The recording medium having recorded thereon a computer-readable program according to claim 66 wherein said first extraction step extracts one or a plurality of pixels from each of said pupil picture and the storage picture, as said first pixel information, and wherein said feature value detection step uses the pixel values of said one or plural pixels to make still/moving decision of said subject pixel, while detecting the results of decision as said feature value.

76. The recording medium having recorded thereon a computer-readable program according to claim 75 wherein said first feature value detection step detects the differences of luminance values of said first picture and said storage picture by using the pixel value of said one or plural pixels and detects the calculated results as said feature value.

77. The recording medium having recorded thereon a computer-readable program according to claim 66 wherein said first extraction step extracts a first class tap from

said pupil picture as said first pixel information, while extracting a second class tap from said storage picture; and wherein said feature value detection step makes still/moving decision of said subject pixel by using said first and second class taps and detects the results of decision and the distribution of pixel values of pixels making up said first class tap as said feature value.

78. The recording medium having recorded thereon a computer-readable program according to claim 66 wherein said second extraction step extracts prediction taps as said second pixel information.